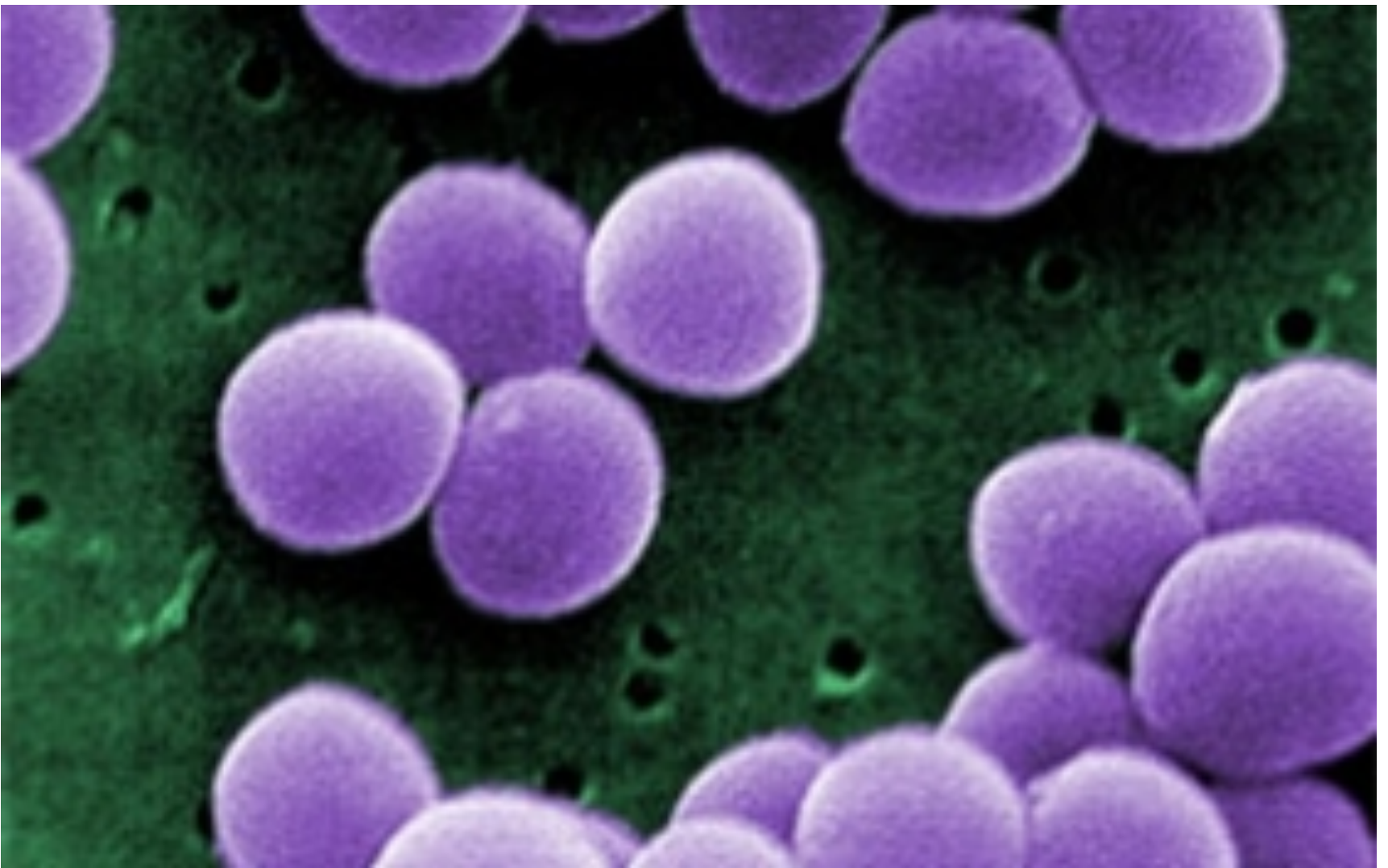


EVERYDAY SCIENCE

Fact or Fiction?: The 5-Second Rule for Dropped Food

There may be some actual science behind this popular deadline for retrieving grounded goodies

By Larry Greenemeier on March 25, 2014



This scanning electron micrograph (SEM) shows a strain of *Staphylococcus aureus* bacteria. *Credit: Courtesy of the Centers for Disease Control and Prevention's Public Health Image Library, via Wikimedia Common*

You're about to savor your first bite from a delicious candy apple when, just as your teeth are about to sink in, the fruit–candy combo slips from its stick and plummets to the ground. The clock is ticking. You quickly snatch the fallen morsel, well within five seconds—the acknowledged time limit for determining whether dropped food should end up in your mouth or in the trash.

What happens next is generally a judgment call depending on several factors—what was

dropped, where it was dropped and the victim's level of hunger. What to do could also pivot on whether or not the most recent health column you read covering this topic on the Web said that you could get away with putting the dropped food in your mouth without a trip to the emergency room. A lot of research—and common sense, really—might indicate that any dropped food carries a risk of collecting bacteria. So the only real questions might be how great the risk is and whether it's worth taking.

Food retrieved just a few seconds after being dropped is less likely to contain bacteria than if it is left for longer periods of time, researchers at Aston University's School of Life and Health Sciences in England recently reported. The Aston team also noted that the type of surface on which the food has been dropped has an effect, with bacteria least likely to transfer from carpeted surfaces. Bacteria is much more likely to linger if moist foods make contact for more than five seconds with wood laminate or tiled surfaces.

The current study, undertaken by six final-year biology students led by Aston microbiology professor Anthony Hilton, is likely to only inflame an ongoing debate about this informal rule of food safety, as other studies have found that pathogens transfer themselves to food as soon as that piece of meat or candy hits the kitchen tiles.

The researchers found that the initial impact immediately transferred at least a small proportion of bacteria resident on a floor to just about any type of food. Moist foods left longer than 30 seconds, however, contained up to 10 times more bacteria than food picked up after three seconds. “We believe that additional contact is being made between the moist food and the floor as it settles further onto the floor,” Hilton says. Dry foods dropped on the carpet experienced the slowest rate of bacterial migration.

The researchers monitored the transfer of the common bacteria *Escherichia coli* and *Staphylococcus aureus*—the latter of which causes staph infections—from a variety of indoor floor types to toast, pasta, biscuits and a sticky sweet when contact was made from three to 30 seconds.

Hilton and his students had initially been studying the survival and transfer of bacteria on indoor flooring surfaces. The researchers found staph to be the most commonly isolated bacterium on the flooring they examined. They included *E. coli* in their work because it is a common gut bacterium, often used to model how other gut pathogens—such as salmonella—respond under different conditions. “We introduced time as a factor as a bit of a quirky

parameter to explore and didn't really expect it to show anything significant," he says.

The researchers speculate that the contact area made between food and floor surface is significant. "On a smooth surface like tile or laminate the area of contact is greater than when the food is suspended on the tips of the fibers of the carpet," Hilton says. "I think the results from the carpet were the most surprising in transferring very low numbers of bacteria to food and not demonstrating the same effect of time in enhancing transfer."

Most of the 495 people that Hilton and his team surveyed as part of their research had heard of the so-called "five-second rule" but "there was still a good number of people that hadn't," he says. Regardless, 87 percent of survey participants who adhere to the five-second rule said they would eat food dropped on the floor or already have done so. The researchers also found that 81 percent of females surveyed use the rule, compared with 64 percent of males. Hilton says he doesn't have a good explanation for this gender differentiation but points out that this finding is consistent with other research into the five-second rule. One possible conclusion: This is tacit confirmation of another piece of folk wisdom—men are less discerning when it comes to their food's cleanliness.

The research began as a class project, but Hilton says widespread interest in the results has encouraged him to prepare the work for submission to a peer-reviewed journal.

The Aston findings give the dropped-food guideline more legitimacy than have other studies, which tend to consider the rule unadulterated baloney. "We found that bacteria was transferred from tabletops and floors to the food within five seconds—that is, the five-second rule is not an accurate guide when it comes to eating food that has fallen on the floor," said Paul Dawson, a professor in Clemson University's Department of Food, Nutrition and Packaging Sciences, following his 2007 study. That study, published in the *Journal of Applied Microbiology*, was primarily aimed at measuring the persistence of bacteria on surfaces.

The Clemson researchers found that *Salmonella typhimurium* "can be transferred to the foods tested almost immediately on contact" and that the bacteria can survive for up to four weeks on dry surfaces in high-enough populations to be transferred to foods.

A 2003 study by then high-school senior Jillian Clarke, during an internship at the University of Illinois at Urbana–Champaign, likewise found that bacteria transfers to food

immediately on contact. In her experiment *E. coli* moved from floor tiles to cookies and gummy bears well within five seconds.

Most studies, it would seem, discourage adherence to the five-second rule. So, even though Aston’s findings suggest that allowing dropped food to linger on the floor certainly increases the risk of bacterial transfer to that fallen indulgence, it’s better to think twice before eating anything that touches an unsavory surface—whether it’s your kitchen floor or your favorite diner.

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